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Research on Diagnosis and Improvement of School Neighborhood for Creating Child-friendly Cities

Chapter 1. Introduction

In 2013, the life satisfaction and subjective happiness levels of children in Korea appeared to be the lowest among OECD nations. This is an index clearly showing the problems with the quality of life among children in Korea, and also, circumstantial evidence showing that our urban environment has not been friendly to children. Our children are being threatened by crime and traffic accidents within the urban area. Children are losing a venue for playing and enjoying leisure activities, within areas not able to guarantee ‘safety,’ which is a fundamental right, and furthermore, are being deprived of opportunities for growth and experience that can be enjoyed in an urban area.

Such situation implies that the necessity is increasing for neighborhood environments that guarantee opportunities to experience and grow, in addition to a safe and active life for children, thereby enabling a ‘child-friendly’ neighborhood environment. Against this backdrop, various spatial usage policies have been enforced over schools and school neighborhoods, which is the main activity radius of children. However, as scores of policies have been enforced sporadically with different purposes depending on the competent ministries of government, the existing policies have exhibited various limits.

As such, the purpose of this research is to develop a ‘policy enforcement support tool’ that can be utilized when local governments enforce environment improvement projects in school neighborhood units, through reviewing relevant policies and basic research on the behavior of children. This is premised in tactical urbanism and community involvement planning including children, while providing theoretical and practical implementation tools and application methodologies to support decision-making for major policies necessary for the enforcement of related projects by local governments. The support tools are largely composed of a ‘child-friendliness level diagnosis tool’ and ‘participatory design support tool.’ The contents and organizational system of the research are shown in the following Figure 1.

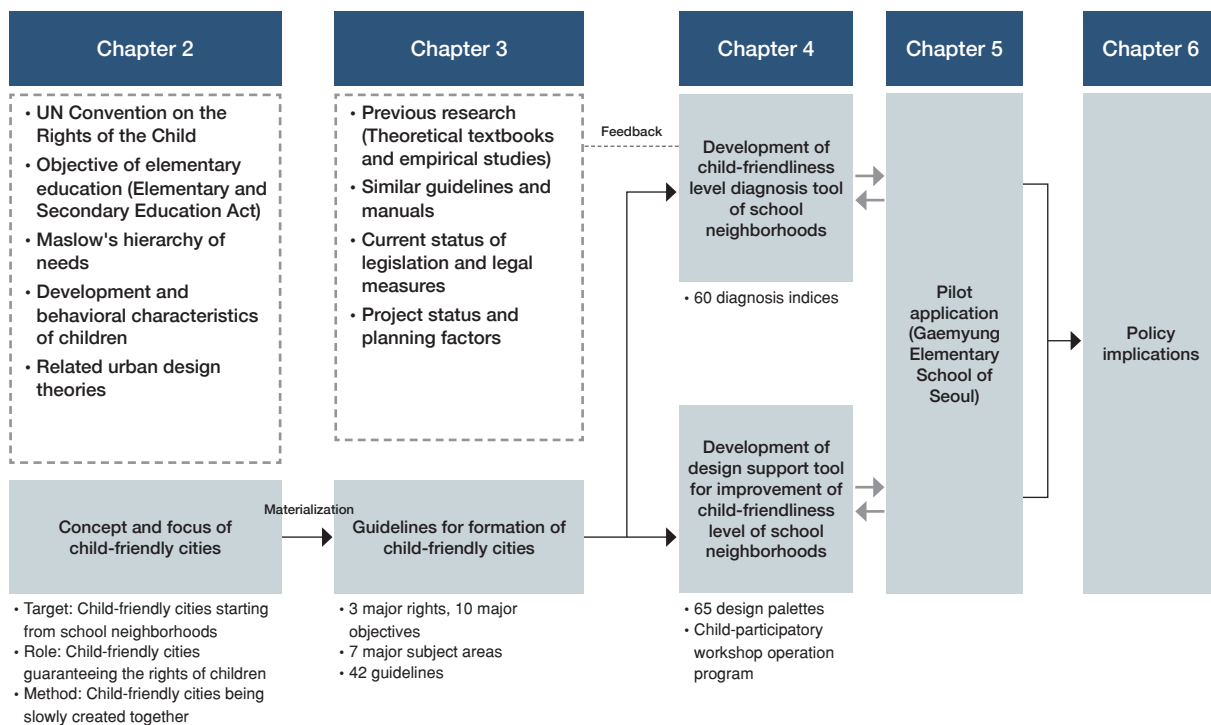


Figure 1. Research Flow and Composition System

Chapter 2. Child-friendly Cities: Concepts and Directions

Chapter 2 establishes the concept of child-friendly cities based on theoretical research and deduces the focus for the formation of child-friendly cities. First of all, Section 1 deduces implications on the spatial planning aspects based on the behavioral characteristics, and examines the concept and types of child rights. Section 2 reviews the concept of child-friendly cities under UNICEF and the theories on the target, role, and method of urban planning for children.

Section 3 deduces the concept and focus of child-friendly cities, based on the discussions in Sections 1 and 2. First of all, child-friendly cities are formed by centering around school neighborhoods, which is the main living radius of children, and school neighborhoods are decided by considering the behavioral and developmental characteristics of children. The spatial targets for formation of child-friendly school neighborhoods are largely classified into (1) school interior, (2) school boundaries, (3) front gate area, (4) main commuting route, (5) other roads, and (7) public spaces. Subsequently, child-friendly cities guarantee the rights of children based on the basic principles of the UN Convention on the Rights of the Child and pursue the realization of the elaborate needs of children and the objective of elementary education. Child-friendly cities encourage an ‘active life’ by ‘guaranteeing safety,’ which is a fundamental right of children, and through such, contributes to the ‘growth and experience of children.’ In addition, the growth and development of children through such further enhances the active lives of children, which allows to create a more secure neighborhood environment. The mapping of the three major rights of child-friendly cities and the ten major formation objectives and the interaction between the objectives are shown in the following Figure 2.

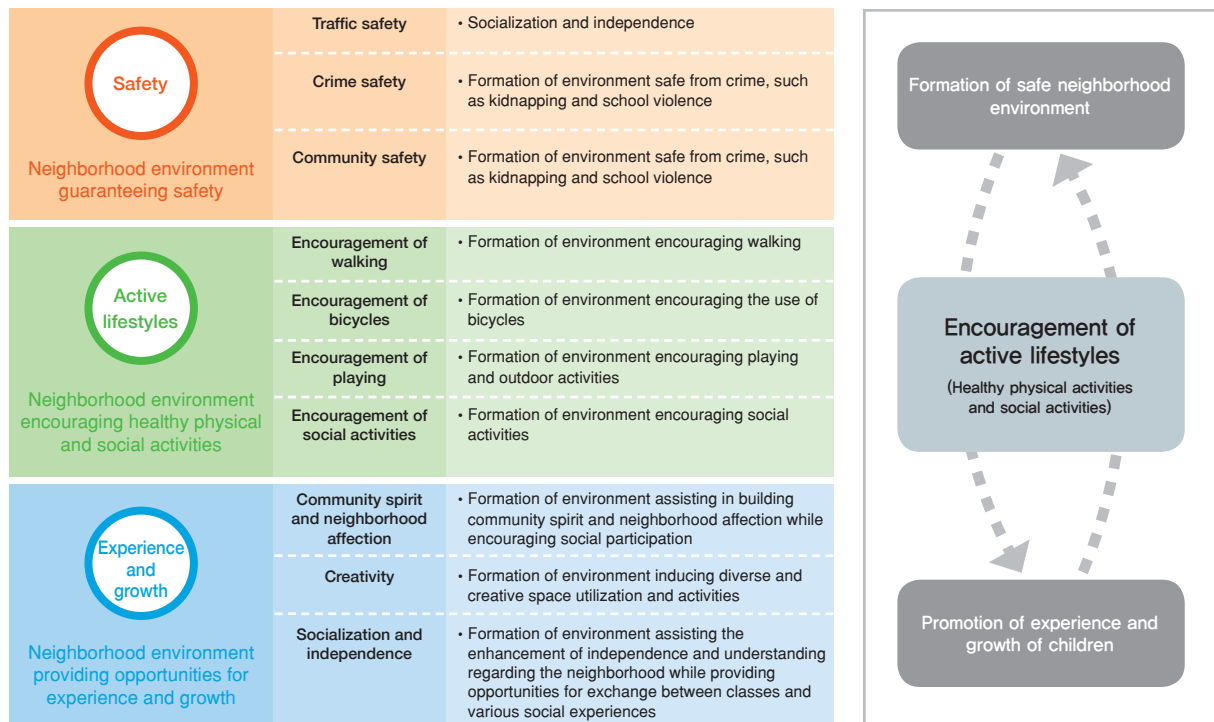


Figure 2. Ten Major Formation Objectives of Child-friendly Cities and Interaction between Objectives

Chapter 3. Establishment of Guideline for Creating Child-friendly School Neighborhood

Chapter 3 establishes a guideline for the formation of child-friendly cities centering around elementary schools by synthesizing materials such as (1) research documents, (2) similar guidelines and manuals, (3) current status of legislation and systems and legal measures, and (4) project status and planning factors, relating to the formation of child-friendly cities. This guideline will be utilized in the process of the development of diagnosis tools and design support tools in Chapter 4. The categories of the guideline for the formation of child-friendly cities are shown in the following Figure 3. Each guideline includes the contents for formation guidelines by category, area type by subject of application, policy types, types of connected guidelines, supporting literature, recommendations, references, and definition of terms.




 <p>Safety</p> <p>Neighborhood environment guaranteeing safety</p>	Traffic safety	<ul style="list-style-type: none"> • A-1. Formation of pedestrian area by road width • A-2. Designing of vehicle speed reduction-type streets • A-3. Designing of pedestrian-oriented crosswalks and intersections • A-4. Separation of traffic flow of pedestrians and vehicles within the school • A-5. Limitation of vehicular traffic during hours of commuting to and from school • A-6. Designation of areas for people to get into and out of vehicles and management of parking • A-7. Limitation and control of vehicle speed • A-8. Strengthening of traffic safety education and commuting instructions
	Crime safety	<ul style="list-style-type: none"> • B-1. Encouragement of natural surveillance of public spaces • B-2. Control of access to potential crime areas • B-3. Prevention of crime and control of unused areas • B-4. Prevention of school violence through opening of school facilities • B-5. Preparation of crime surveillance facilities and conditions • B-6. Preparation of crime reports and evacuation facilities • B-7. Strengthening of crime safety education and prevention of school violence
	Community safety	<ul style="list-style-type: none"> • C-1. Introduction of slip-resistant facilities and reorganization of roads • C-2. Management of dangerous areas and control of access • C-3. Installation of protection zones and traffic guidance signboards • C-4. Management of school environment sanitation and purification area • C-5. Management of food safety protection areas for children • C-6. Operation of school security personnel
 <p>Active lifestyles</p> <p>Neighborhood environment encouraging healthy physical activities and social activities</p>	Encouragement of walking	<ul style="list-style-type: none"> • D-1. Construction of walking network and enhancement of connectivity • D-2. Minimization of detour roads to facilitate walking • D-3. Exclusion of facilities that impede walking and a gradual change from areas for vehicles to areas for pedestrians • D-4. Formation of barrier free pedestrian environment • D-5. Introduction of convenient facilities and removal of impediments to walking
	Encouragement of bicycles	<ul style="list-style-type: none"> • E-1. Construction of bicycle path network • E-2. Installation of convenient facilities for bicycles • E-3. Education on safe bicycle culture
	Encouragement of playing	<ul style="list-style-type: none"> • F-1. Formation of play area within schools • F-2. Formation of play area nearby schools • F-3. Formation of secret play areas
	Encouragement of social activities	<ul style="list-style-type: none"> • G-1. Expansion of social places and facilities • G-2. Formation of meeting places in front of schools
 <p>Experience and growth</p> <p>Neighborhood environment providing opportunities for experience and growth</p>	Community spirit	<ul style="list-style-type: none"> • H-1. Demolishment of housing fences • H-2. Launching of and participation in regional events • H-3. Operation of autonomous school neighborhood cultivation programs
	Creativity	<ul style="list-style-type: none"> • I-1. Provision of area for creative activities and learning • I-2. Provision of multi-purpose variable areas and facilities • I-3. Encouragement of various utilization of school fences
	Socialization (independence)	<ul style="list-style-type: none"> • J-1. Provision of opportunity to experience various areas and activities • J-2. Formation of village map together

Figure 3. Summary of Guidelines for Formation of Child-friendly Cities

Chapter 4. Development of School Neighborhood Diagnosis and Design Support Tools

Chapter 4 develops the diagnosis tool for the level of child-friendliness of school neighborhoods and deduces a ‘design palette,’ a participatory design support tool, and child-participatory design workshop programs. First of all, Section 1 of Chapter 4 deduces a child-friendliness level diagnosis index based on the guideline of Chapter 3, and suggests the triangulation methodology to measure such. This is composed of the statistical data, floor




Objective	Statistical data and floor plan analysis (Phase 1)	Field investigation (Phase 2)	Resident opinion survey (Phase 3)
 <p>Safety</p> <p>Neighborhood environment guaranteeing safety</p>	<ul style="list-style-type: none"> • Number of occurrences, location, and types of traffic accidents • Place of getting in or out of vehicles for coming to and going from schools • Existence of commuting guidance at the time of going to and coming from school • Existence of a constable and security personnel at school • Opening of school facilities and operation hours • Existence of operation of vehicular traffic limitation system by the hour • Status of availability of fast food stores nearby the school • Status of availability of harmful facilities • Number of occurrences, location, and type of crimes • CCTV, streetlight, and security light locations • Location of crime prevention facilities • Sex offender residency status 	<ul style="list-style-type: none"> • Perceived vehicle speed • Application status of traffic calming technique • Status of illegal parking • Level of conflict between the vehicle and pedestrian traffic flow within the school • Status of management of unused areas • Status of potential crime areas nearby the building • Ratio of windows facing the roads • Existence of construction sites 	<ul style="list-style-type: none"> • Safety from traffic accidents and evaluation of risk areas regarding traffic accidents • Safety from crime and evaluation of crime risk areas • Eating experience of harmful food and purchasing source • Scope of permission regarding independent walking of children
 <p>Active life</p> <p>Neighborhood environment encouraging healthy physical and social life</p>	<ul style="list-style-type: none"> • Location and number of gates into the school • Sidewalk installation status • Number and location of crosswalks • Status of installation of bicycle paths and convenient facilities • Status of areas to utilize for playing, sports, and recreation • Status of location of walking inducement facilities and driving inducement facilities • Entrance for parking for vehicle inducement facilities • Strengthening of facilities stimulating social activities 	<ul style="list-style-type: none"> • Commuting route • Amount of vehicular traffic and pedestrian traffic of road • Effective width and pavement condition of sidewalk • Connectivity of sidewalk and impediments to walking • Installation status of bicycle paths • Effective width and pavement condition of bicycle paths • Connectivity of bicycle paths and impediments • Grade of school entry and the difference of height of entrance • Location where children play and type of games • Location where social activities of children occur and types of social activities • Location where other activities of children occur and types of activities 	<ul style="list-style-type: none"> • Amount of walking for the past one week • Location frequently used by walking • Convenience of walking and bicycle use • Playing time and location of children in the neighborhood • After school activities
 <p>Experience and growth</p> <p>Neighborhood environment providing opportunities of experience and growth</p>	<ul style="list-style-type: none"> • Status of overall or partial opening of school fence and formation of park • Use of building nearby the opening part of school fence • Status of demolishment of fences of residential buildings 	<ul style="list-style-type: none"> • Ratio of neighborhood commercial facilities using lower floors • Existence of installation of signboard providing information on commuting route and map nearby the school • Status of areas formed and managed by children • Status of areas stimulating the imagination of children 	<ul style="list-style-type: none"> • Existence of regional community events where children may participate and the participation level • Resident exchange venue • Areas with a sense of affection as considered by children • Areas considered to be fun by children • Proud aspects of the neighborhood

Figure 4. Diagnosis Index for Evaluation of Child-friendliness Level of School Neighborhood

plan analysis, field investigations by experts, and survey of students, faculty, and residents. The diagnosis tool is finally confirmed through preliminary application concerning the commuting zone of Gaemyung Elementary School, among the subject fields of the Amazon Project of Seoul in 2015. The diagnosis index deducted through this process shown in the preceding Figure 4. The main body specifically suggests matters such as the survey items, field investigation methods and guidelines, as well as types and sources of the data for measuring the diagnosis index. This diagnosis tool is utilized for the purpose of understanding the issues and potential of school neighborhoods regarding the child-friendliness aspect.

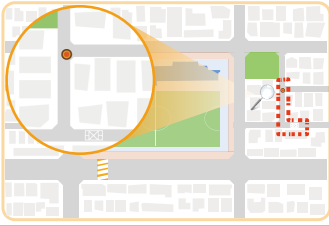

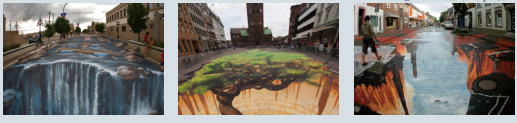

Section 2 develops the ‘design palette,’ which is a school neighborhood design support tool. This performs the role of providing support so that the improvement plan may be decided by the decision-making consultative group, composed of students, residents, faculty, public officials, and experts. If the guideline suggested in Chapter 3 had been suggested by specifying the formation direction (focus) by type of area of school neighborhoods, design palette can be seen as a tool to support the design participation of the general public, in addition to experts, by providing detailed information relating to the specific plans and design techniques necessary to realize the direction of such plans. The categories of palette are largely classified into physical environment improvement, program operation, and education, and the physical environment improvement is re-classified into urban planning, neighborhood design, architectural design, and school design depending on the rank. The 65 palette categories finally deducted are as follows.

The contents of each design palette are composed of the objective and basic concept of the pertaining technique, related laws and systems, and domestic and overseas case studies, and each design palette supplies additional information such as places available for application, application period and expenses, expected effects, strengths and weaknesses, and considerations. An example of composition of the design palette is as follows.

Lastly, Section 3 suggests a child-participatory design workshop operation program to apply the opinions of children who have difficulty in utilizing the design palette. This has the strength of allowing to deeply understand the thoughts of children regarding the school neighborhood environment. This program is formed by considering the characteristics of children and the curriculum based on the advice of current teachers, and the final plan includes mind-map drawing, neighborhood map drawing, mapping of neighborhood features, and play area designing. The main body suggests the workshop guidelines and detailed operation programs.

Policy type		Code	Palette name
Physical environment	Urban planning (U)	PE-U-1 PE-U-2 PE-U-3 PE-U-4 PE-U-5	<ul style="list-style-type: none"> • Walking network construction • Small-sized block and road design • Exclusion of facilities that impede walking (influx of vehicles) • Construction of bicycle path network • Introduction of social places and facilities
	Neighborhood design (N)	PE-N-1 PE-N-2 PE-N-3 PE-N-4 PE-N-5 PE-N-6 PE-N-7 PE-N-8 PE-N-9 PE-N-10 PE-N-11 PE-N-12 PE-N-13 PE-N-14 PE-N-15 PE-N-16 PE-N-17 PE-N-18 PE-N-19 PE-N-20 PE-N-21 PE-N-22 PE-N-23 PE-N-24 PE-N-25 PE-N-26 PE-N-27 PE-N-28 PE-N-29 PE-N-30 PE-N-31 PE-N-32 PE-N-33	<ul style="list-style-type: none"> • Formation of pedestrian priority streets • Installation of sidewalks • Installation of crash barriers • Formation of zigzag roads (Chicane) • Narrowing of driveway width (Chocker) • Textured pavement of roads • Installation of speed bumps • Installation of speed warning system and intersection alarms • Installation of raised intersection and crosswalk • Installation of pedestrian islands/curve-type crosswalk • Installation of smart crosswalks • Enhancing the visibility of intersections • CCTV installation and integrated control • Installation of streetlights and security lights • Installation of security bells • Slip-resistance pavement and maintenance of roads • Installation of facilities controlling access to construction sites • Installation of signboard providing information on traffic and protection areas • Procurement of pedestrian walkways within large complexes and buildings • Implementation of road diet • Formation of parklets • Designing of barrier free roads • Removal of impediments to walking • Installation of convenient facilities for pedestrians • Installation of convenient facilities for bicycles • Formation of play area on the floor to provide experience • Formation of adventure playground • Formation of park of one pyeong • Formation of pop-up café • Formation of ecological vegetable garden • Formation of pop-up park • Formation of creative activity areas • Formation of multi-purpose variable area
	Architectural design (A)	PE-A-1 PE-A-2 PE-A-3 PE-A-4 PE-A-5 PE-A-6	<ul style="list-style-type: none"> • Placement of windows and gates along roadsides • Attachment of reflecting strips and mirror sheets • Installation of facilities controlling access of outsiders • Installation of penetration-type walls and demolition of fences between houses • Lower floor front gate designing with high penetrability • Introduction of street-friendly type use and utilization of lower floors
	School design (S)	PE-S-1 PE-S-2 PE-S-3 PE-S-4 PE-S-5 PE-S-6 PE-S-7 PE-S-8	<ul style="list-style-type: none"> • Separation of traffic flow for pedestrians and vehicles within the school • Demolishment of school fences and formation of linear parks • Installation of multi-direction doors at school • Formation of play area within school • Creation of park and forest at school • Amalgamation of school facilities • Formation of creative learning area • Decoration of school fences
Program operation (PR)		PR-1 PR-2 PR-3 PR-4 PR-5 PR-6 PR-7 PR-8 PR-9	<ul style="list-style-type: none"> • Vehicular traffic control at commuting hours • Control of parking and limitation on street parking • Designation of areas for students to get in or out the car • Limitation on car speed • Designation and operation of guardians' houses for child safety • Control of harmful business establishments • Control of harmful food products and designation of exemplary stores • Operation of student security personnel • Opening of school and holding of events
Education (ED)		ED-1 ED-2 ED-3 ED-4	<ul style="list-style-type: none"> • Traffic safety education and school commuting instructions • School violence and safety from crime education • Safe bicycle culture education • Formation of village map together

Figure 5. 65 Design Palette Categories

Formation of play area on the floor to provide experience [physical environment improvement > neighborhood design] [T]		PALETTE CODE																				
Related guideline: F-2, Formation of play area near by school/A-2, I-1, J-1		PE-N-26																				
Objective Road trick-art and traditional floor games on road The role of providing a play area for children while inducing the vehicles to slow down through an illusionary effect by painting in traditional floor games or three-dimensional pictures on the road	Application methods Places available for application 	1) Plan technique name 2) Policy type 3) Possibility of tactical urbanism application 4) Related guideline 5) Palette identification code																				
Contents Road trick art Definition Trick art is an art form used to delude the viewers to feel that an artwork is not a picture but a real situation, through combining painting techniques, through pictures or artworks using tricks, by using optical illusions, and is applied as a road coloring technique for urban design Traditional floor games on the road Definition A road coloring method for drawing in traditional games on the road to provide a play area for children and to a guarantee the walking range Types There are various types including hopscotch, squid game, and snail game 	(3) Front gate area (4) Main commuting route This is appropriate for narrow roads or dead-end alleys of roads where the traffic of vehicles is physically blocked or where the area is a restricted area for vehicular traffic by the hour within the site subject to the Amazon Project and children protection zones Application period and expenses Application period Approximately one month is required from field investigation to completion of construction when installing only trick art Application expenses Approximately KRW 3 million is required when only installing trick art, and for traditional floor games, the owners can easily install by themselves at an extremely low cost Expected effect Strengths and weaknesses Strengths 1) A reduction effect on driving speed becomes notable because the road is acknowledged as a road prioritizing pedestrians 2) The roadsides may be acknowledged as a play area, in addition to a traffic area 3) One is able to enjoy the pleasure of being tricked by the momentary confusion of reality and illusion 4) Brain stimulation is known to be heightened simply by seeing Weaknesses 1) Drivers may press the brakes suddenly by being surprised 2) Excessive application of trick art or traditional floor games may rather harm the scenery 3) Trick art requires relatively high expense and easily loses its initial appeal Effect by sector <table border="1"> <tr> <td>Traffic safety</td> <td>Crime safety</td> <td>Community safety</td> <td>Encouragement of walking</td> <td>Encouragement of bicycles</td> </tr> <tr> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td>Participation in recreation</td> <td>Encouragement of social activity</td> <td>Community spirit</td> <td>Creativity</td> <td>Socialization</td> </tr> <tr> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> </table> ● : Direct effect, ○ : Indirect effect Considerations Precautions upon application 1) No installation shall be undertaken on the main arterial road which is mostly used by vehicles 2) Selection shall be made by considering whether the area may be continued to be used as an area where children can play 3) Images that are overly provocative or having clear color contrasts shall be refrained from use 4) Planning shall be undertaken to form harmonious landscape with the nearby areas 5) Applying the opinions of children or allowing the children to directly participate is recommended	Traffic safety	Crime safety	Community safety	Encouragement of walking	Encouragement of bicycles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Participation in recreation	Encouragement of social activity	Community spirit	Creativity	Socialization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1) Objective of planning technique 2) Contents of planning technique - Definition and concept - Related laws (optional) - Classification and standard (optional) 3) Case studies of planning technique - Domestic - Overseas (optional)
Traffic safety	Crime safety	Community safety	Encouragement of walking	Encouragement of bicycles																		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																		
Participation in recreation	Encouragement of social activity	Community spirit	Creativity	Socialization																		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																		
Case studies Trick art as an urban design technique Germany: Edgar Mueller, a street artist Various works of trick art are being displayed by using the street as a canvas, and the artist started to draw artworks for the purpose of preventing speeding, desiring for his own activities to not only present joy to the viewers, but to be of actual assistance 	Trick art and traditional floor games to facilitate protection of children Korea: Amazon Project An area, where children wish to and are able to play in, may be formed by creating an environment prioritizing pedestrians while decreasing the driving speed by painting in traditional floor games and trick art in particular areas among the vehicular traffic limitation sectors by the hour, by applying as a planning aspect of the Amazon Project, as a zone where children may freely use and pass by 	1) Application method - Place available for application (per object of area) - Application process - Period and expense 2) Expected effect - Strengths and weaknesses - Effect by sector (per 10 major objectives) 3) Considerations - Precautions																				

Source: "Pictures Drawn on the Road Decrease Accident Rates?" Road Traffic Authority Webzine v. 148

Figure 6. Examples of Design Palette and Description

Chapter 5. School Neighborhood Diagnosis and Design: An Application of Support Tools

Chapter 5 applies the support tools deduced in Chapter 4 as a pilot test of Gaemyung Elementary School of Seoul, thus, suggests the method and procedure of diagnosis of school

neighborhoods and establishment of improvement plans. First of all, Section 1 suggests the results of diagnosing the child-friendliness level regarding the commuting zone of Gaemyung Elementary School. The examples of statistical data and floor plan analysis, field investigations by experts, and results of resident opinion survey and the results of analyzing the potential and issues by sectors deduced based on such examples are as follows.



Example of floor plan analysis: Commuting map location



Example of field investigation: Volume of pedestrians when commuting to school



Example of resident opinion survey: Crime risk locations

Figure 7. Example of Floor Plan Analysis, Field Investigation, and Resident Opinion Survey Result



Detailed sectors	Issues	Potential
School (school interior, school boundary, and front gate area)	<ul style="list-style-type: none"> The difference of height with nearby areas is extreme Vehicle entry is only possible through the front gate Fence opening and formation of a linear park is not possible 	<ul style="list-style-type: none"> An area to encourage imagination and creativity may be formed at the playground as a play area, a place instilling a sense of affection, a fun place, and a place where the social activities for children occur
Main commuting route at the front gate (main commuting route)	<ul style="list-style-type: none"> There is no sidewalk (partial section) The effective road width is narrow (partial sectors) The road pavement condition is substandard (partial sectors) There is an alley entrance that is not visible 	<ul style="list-style-type: none"> An area to encourage socialization and creativity may be formed as the ratio of neighborhood commercial facilities using lower floors is high and it is a location where social activities for children occur
Main commuting route at the back gate (main commuting route)	<ul style="list-style-type: none"> The active sidewalk is narrow (partial section) There is a high volume of vehicular traffic The vehicle slowdown speed is very fast 	
Main school route and front gate area (public area)	<ul style="list-style-type: none"> A vehicular traffic limitation system by the hour is not operated Commuting instructions are not provided during after-school hours The roads for pedestrians and vehicles are not separated, thus, rendering the area to become dangerous 	<ul style="list-style-type: none"> An area to encourage social activity can be formed at a place with high volume of pedestrians when going to and coming from school
Inner roads of residential areas between the front and back gate (other roads and nearby buildings)	<ul style="list-style-type: none"> There is an insufficient amount of CCTVs There is an insufficient amount of streetlights There are many dark Plotis areas 	
North side residential area (inner roads and houses, other roads and nearby buildings)	<ul style="list-style-type: none"> There is a great deal of illegal parking The effective road width is narrow The road pavement condition is substandard There are many dark Plotis areas 	<ul style="list-style-type: none"> Some are implementing the demolition of walls which is enhancing community spirit, thus, demolition of fences between houses within the neighborhood may be encouraged
Pedestrian priority road (other roads)	<ul style="list-style-type: none"> There is one harmful project establishment There are many impediments to walking 	<ul style="list-style-type: none"> An area to encourage socialization and creativity may be formed because the ratio of neighborhood commercial facilities using lower floors and areas with social activities for children is high
Neighborhood commercial roads (other roads)	<ul style="list-style-type: none"> There is no sidewalk 	<ul style="list-style-type: none"> An area to encourage socialization and creativity may be formed because there is a high ratio of neighborhood commercial facilities using lower floors
Neighborhood commercial roads (other roads)	<ul style="list-style-type: none"> There is a high volume of vehicular traffic The vehicle slowdown speed is fast There are many vehicles parked on the street 	<ul style="list-style-type: none"> The roadside may be cultivated to form a socialization and community area due to the adjacency of Mokgamcheon Stream
Playground and park within the apartment complex (other roads)		<ul style="list-style-type: none"> An area that stimulates creativity and socialization may be formed as an area that instills affection to the neighborhood and is a fun location, as it is an area where the social activities of children and residents take place
Mokgamcheon Stream (public area)		<ul style="list-style-type: none"> Community spirit and socialization may be encouraged through launching of events and formation of a meeting place for residents of the area, as an area that instills community spirit and socialization

Figure 8. Result of Analysis of Potential and Issues by Sector

Section 2 suggests the result of implementation of the design workshop participated in by 35 children. Examples of the main results are as follows. This result is not only utilized as supplementary material for the neighborhood environment diagnosis result, but suggests the design direction regarding the areas mainly used by children, such as play areas.



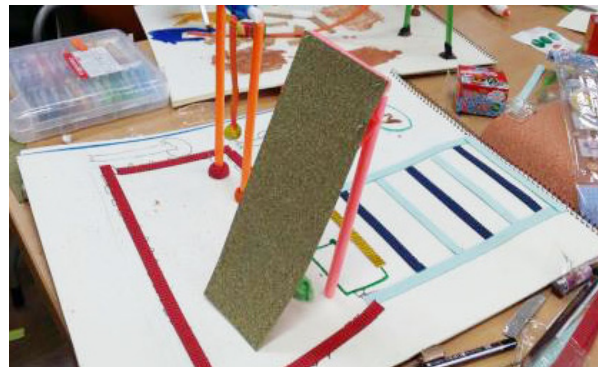
Drawing a map of our neighborhood



Mapping of good areas, bad areas, and play space



Designing of play area 1



Designing of play area 2

Figure 9. Example of Workshop Results

Lastly, Section 3 establishes a neighborhood environment improvement plan for Gaemyung Elementary School based on the child-participatory workshop implementation result and diagnosis result of the child-friendliness level. First of all, the design palettes applicable by sectors are deducted based on the design palettes and results of analyzing the potential and issues by sector. Through this process, the master plan for the comprehensive improvement plan regarding the entire area may be established as follows.

Subsequently, a detailed improvement plan is established by selecting the main commuting route at the front gate, where traffic going to and from school is concentrated, as the central improvement sector. For such, an in-depth diagnosis is formed, such as through video recording, child behavior analysis, in-depth field investigations, and interviews, regarding the central improvement sector.

The focused improvement sector improvement plan is deduced by comprehensively considering the in-depth diagnosis result, result of implementing the child-participatory design workshop, and applicable design palettes. The improvement plans at the level of urban designing deduced as an example by test applying the series of processes and tools explained above are as follows.



Figure 10. Master Plan for Comprehensive Improvement Plan for Neighborhood Environment of Gaemyung Elementary School (draft)



Figure 11. Master Plan for Central Improvement Sector Improvement Plan and Aerial View (draft)

Chapter 6. Conclusion

The support tool for the diagnosis and improvement of school neighborhood environment suggested in this study has significance as a tool for establishing a cooperative plan for efficient formation of child-friendly cities. This can be utilized as a systematic tool providing support so that various agents, such as students, faculty, parents, and the general public, in addition to policy managers or urban planning experts, may diagnose the problems of the region and prepare an improvement measure by themselves. In addition, the pilot application process based on such performs the role of a manual that allows one to easily use the support tools suggested in this research, and the result performs the role as an example of the diagnosis report and improvement plan (draft) that must be finally prepared by the agent using this tool.

For formation of child-friendly cities, there is a need to prepare a more fundamental policy implementation system in the long run. Above all, there is a need to prepare a system basis allowing to comprehensively enforce the area policies subject to school neighborhoods, thus, applicable Act should be established (tentatively named “Child-Friendly City Formation Support Act”, etc.). Based on such, there is a need to achieve integrated diagnosis and improvement that is not biased towards one factor. In addition, after the system basis is prepared, policy guideline development and dissemination will have to follow in order to enforce it. The diagnosis tools and design support tools suggested by this research have been prepared so that all factors relating to the fundamental rights of children may be comprehensively dealt with, rather than concentrating on one factor among the various factors that must be equipped by child-friendly cities. Thus, development of a policy guideline may be promoted based on the results of this research. This research will function as a policy decision-making support system for the integrated planning and management of school neighborhoods.

Key words : Children, Child-friendly Cities, Diagnosis Tool, Design Palette, Design Charrette

